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A short history of the establishment of kindergartens in British Columbia prefaces this study of 22,000 public school children in grades one, two, and three (who had or had not attended kindergarten) in School District 39 of Vancouver and District 61 of Victoria. The effect of kindergarten attendance was evaluated as it related to (1) report card ratings, (2) adaptation to school, (3) intelligence, (4) academic achievement in grade 2 (Victoria only), and (5) retardation and acceleration in grades one, two, and three. Somewhat less than half the pupils had attended kindergarten. A "blind study" was conducted, which obtained teacher ratings on individuals on a descending scale from outstanding to unsatisfactory on the five effects under investigation. Results revealed that (1) report card ratings (for work and health habits and behavior) were generally higher for children who attended private kindergartens; (2) school adaptation seemed to be related to kindergarten attendance; (3) IQ's were highest for those who had attended private kindergartens, and nonkindergartners ranked lowest; (4) kindergarten attendance was related to higher achievement scores in reading comprehension, word meaning, spelling, and arithmetic for grade two; and (5) very little acceleration was found, but that in evidence was related to private kindergarten attendance. (DO)

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Educational Research Institute of B.C.

A STUDY OF KINDERGARTEN AND NON-KINDERGARTEN CHILDREN

by C. B. Conway

STUDIES & REPORTS

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A STUDY OF PUBLIC AND PRIVATE KINDERGARTEN AND NON-KINDERGARTEN CHILDREN IN THE PRIMARY GRADES

SCHOOL DISTRICTS 39 and 61

VANCOUVER and VICTORIA

BRITISH COLUMBIA

C.B. Conway, and

other Members of the

Department of Education

Victoria, B.C.

January, 1968

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THE DEVELOPMENT OF KINDERGARTENS IN B.C. PUBLIC SCHOOLS (1)

There were no kindergartens in B.C. public schools in the years preceding the second World War although there were numerous private kindergartens in the Victoria, Vancouver and Okanagan areas. Some of the latter had originated soon after World War I and their number increased rapidly in the early 1940's. There also were a few nursery schools in the largest cities and an outdoor "Children's Garden Library" (a play school) in Victoria.

As early as 1922 provision had been made for the establishment of kindergarten classes by the school boards of municipal districts. [Public Schools Act, Chap. 22, Sec. 50 (b)]. In fact they were strongly encouraged to do so, the wording in the Act (1941 consolidation) being:

> "47 (1): The Board of School Trustees of each municipal school district shall have the power, and it shall be the duty of the Board .... (b) To establish and maintain kindergarten classes for children between 4 and 6 years of age in all cases where instruction in kindergarten work is considered desirable by the Board."

Notice the permissible age range during this period and that rural boards were not given the power. Rural boards were almost invariably in charge of only one school at that time (392 of the 596 elementary schools in existence in 1943 had only one room) and it was not thought advisable.

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(1) For the historical development of kindergartens in general and a selective bibliography see Bain, David A.: "The Kindergarten in Our Modern Society, An Analysis of Selected Research;" Information Bulletin No. 1, B.C. Educational Research Council, 1967, Pp. 38. The section on "Kindergartens in British Columbia" (pp. 5-6) seems to have been hastily compiled and contains some errors and omissions, (see Appendix). Therefore it is recommended that these historical notes be substituted. A few Canadian research reports also are listed for addition to Dr. Bain's bibliography.

Although teacher and pupil grants for kindergartens were available on the same basis as those paid for other elementary grades no municipal board had established a kindergarten in B.C. prior to 1944. This was partly due to disinterest by local boards but chiefly to cost, the lack of trained teachers and suitable classrooms, and to the fact that many private nursery schools and kindergartens were available in urban areas(2) although most of them were operated by non-professional personnel.

The concern of several Department of Education officials was expressed from time to time, particularly during the World War II period. Dr. H.B. King, Chief Inspector of Schools, calling them "nursery schools" stated that:

> "No system of education is complete without provision for nursery schools. If public nursery schools are not established, under a scientifically trained staff, private institutions, under people with dubious qualifications, are bound to arise. The public schools then will have the difficult task of undoing, or attempting to undo, the damage which the children will have suffered." (3)

(Dr. King was chiefly concerned with the tendency of private kindergartens to introduce reading and arithmetic at the pre-school level.)

In the meantime pressure was developing in several municipalities, largely among P.T.A. members, primary teachers and primary supervisors, for

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(2) In spite of the growth of public kindergarten enrolment there still were 215 licensed private kindergartens in B.C. in Oct. 1958, of which 153 or 71% were in metropolitan Vancouver or Victoria. At the end of 1966 there were 281 in the Province, most of them admitting children at the nursery school level, and 133 or 47% were in Vancouver or Victoria.

(3) King, H.B., Chief Inspector of Schools: B.C. Public Schools Report, 1944-45, p. Y 42.

the introduction of public "pre-primary" or kindergarten classes. Conferences were held and studies were conducted in Vancouver and Victoria, New Westminster,(4) and Burnaby(5).

Very few B.C. teachers had been trained specifically in kindergarten methods. The first attempt to relieve the shortage was made by the Department in 1943 and 1944 by the establishment of in-service demonstrations for primary specialist teachers at a privately-operated kindergarten and the "Children's Garden Library" mentioned above, and in 1945 the Departmental Summer School of Education scheduled Courses 588 and 589: "Methods in Kindergarten-Primary Education" and "Kindergarten-Primary Demonstration Class" with enrolments of 47 and 49 teachers. The Director, C.B. Conway, stated that "the instruction that was provided .... should prove to be a great stimulus in this important field which is relatively new to B.C. school teachers." (6)

That year (1944-45) six half-day public-school pre-primary classes were opened in Victoria under the direction of Miss Marian James, and four in Vancouver under the direction of Miss Elsie Roy, primary supervisors in their respective cities. The classes were taught by teachers well-trained and indoctrinated at the primary, though not perhaps fully qualified at the kindergarten level, and the total enrolment was 260 pupils. In the Annual

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(4) Shields, Roy S., Inspector of Schools, New Westminster: "A study is being made of the necessity of kindergarten classes for children of pre-school age ...." B.C. Public Schools Report, 1943-44, p. B 87.

(5) Brown, C.G., Inspector of Schools: "Consideration is being given to the organization of kindergartens in Burnaby. Lack of accommodation is the chief barrier to this move ...." Ibid., 1944-45, p. Y 103.

(6) Conway, C.B.: Report of the Summer School of Education; B.C. Public Schools Report, 1944-45, pp. Y 50-51, and 54.

Report Miss M. James wrote:

> "Pre-Primary (Kindergarten):- After considerable deliberation and discussion, the Victoria School Board decided to experiment with a year of pre-Grade I schooling. A school district, not too well favoured economically and culturally, was selected for the experiment. A pre-primary classroom was fitted up in September, and fifty children, a year younger than those normally entering Grade I, began school. Each child attended school for a half-day, either morning or afternoon.
>
> The Board was so impressed with the obvious results that it has established pre-primary classes at two other schools and looks forward to having them in operation at all schools in the not too far-distant future." (7)

One of the chief advocates of kindergartens was H.L. Campbell, Municipal Inspector at the time they were established in Victoria, and Chief Inspector and Director of Curriculum for the Province when a kindergarten curriculum committee was set up in 1946. The committee produced a 93-page Kindergarten Manual which became part of the elementary programme in 1948, and after successive revisions is still in use.

When basic grants were introduced in 1946 after the report of the Cameron Commission, kindergarten teacher grants continued to be the same as those for other elementary teachers, [Public Schools Act, Sec. 19 (6)]. But the grant for pupils in Average Daily Attendance was limited, possibly by oversight, to those enrolled from Grade I upward, [Sec. 19 (1)]. The grant regulations were amended in 1948 to include kindergarten children, [Bill 65, 1948, Sec. 7]. The financial effect to school districts was quite a favourable one since half-time and even quarter-time kindergarten pupils were treated as full-time pupils in attendance and in the pupil/teacher ratios for teacher entitlement. This effect continued until March, 1961, when Chapter 53, Sec. 24 reduced the grants for kindergartens to half the essential operating expenses.

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(7) James, Marian: B.C. Public Schools Report, 1944-45, pp. Y 91-92.

Teacher entitlement was limited at the same time to one teacher for 25-60 (half-time) pupils and multiples of 60 (half-time) pupils for additional teachers.

The power to establish kindergartens that had been granted to municipal school districts in 1922 had been extended to include rural school districts in 1946, [Sec. 102 (g)], but rural school boards were restricted again in 1948 by the addition of the words ".... and approved by the Superintendent of Education", [Bill 65, 1948, Sec. 36]. A tendency was noticed in 1947 and 1948 to admit kindergarten children to ungraded rural schools. The same year K - VI was defined as the range of elementary school grades and in 1951 kindergarten pupils again were included in the basic pupil grants [Sec. 20 (1)] in a clarification of what was already current procedure.

During the years 1958 to 1961 the application of the words "if the Superintendent of Education approves" [Chap. 42, Sec. 163 (b)] was extended to cover kindergartens in municipal school districts. This reduced the almost unlimited power of municipal boards to establish kindergartens and was an alternative to a "trial-balloon" no-grants-for-kindergarten-teachers policy designed to retard the movement of qualified primary teachers from rural to urban areas and ease the shortage of classrooms and qualified teachers. The proposed policy aroused widespread opposition, however, and was never enacted (cf. Johnson and Bain in the Appendix). In practice, the addition of kindergarten classes to either urban or rural elementary schools received approval only when there were: (a) sufficient accommodation in the area for all other grades, (b) fully-qualified kindergarten teachers, (c) at least 25 pupils aged 4.7 to 5.7. As few school districts could find fully-qualified teachers or keep up with the expansion of enrolment at that time the effect was to freeze kindergarten enrolment between 3700 and 3900 although total enrolment in other grades rose 16% during this four-year period.

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When the restriction was lifted in 1962 by the removal of the words "if the Superintendent of Education approves" [Chapter 53, Sec. 24] the demand was so great that kindergarten enrolment doubled almost immediately. This in spite of the fact that no sudden increase in the availability of classrooms (8, 9) or qualified teachers was noticeable.

In October, 1965, there were kindergarten classes with an enrolment of 12,366 in 182 public schools in 26 school districts. In October, 1966, enrolment had risen to 13,854, and in October, 1967, to 15,368 in 43 school districts. That is more than 45% of the available 5-year-old children when those attending private kindergartens, and Indian children and others in remote areas are excluded. During the five-year period (1961-62 to 1966-67) public kindergarten enrolment increased 109% while Grade I enrolment increased only 21%. It should be mentioned that most of the additional teachers were found among those qualified in primary rather than "pre-primary" or kindergarten methods but several workshops and short courses have been provided in the larger school districts. As teachers are generally well qualified in the largest urban districts and in the highest and lowest elementary grades, the chief effect has been drainage of qualified teachers from the intermediate grades, IV - VI, and from the rural areas. In December, 1967 there were 506 underqualified teachers (those with conditional certificates and letters of permission) in elementary schools. This fact, plus the rapidly increasing

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(8) Mackenzie, D.B. and Grant, J.V., Assist. Superintendents of Schools, Vancouver: "In the selection of schools where kindergartens occur .... probably the most important influence is the availability of a classroom." Report on the Vancouver Kindergartens to the Chief Inspector of Schools, March, 1959.

(9) Many of the classrooms used by kindergarten pupils still (1968) have not been specifically designed for pre-primary use, e.g. in the provision of separate washroom facilities.

enrolments in secondary schools and the costs of classroom construction, has limited the tendency to establish kindergarten classes in many school districts. Nevertheless kindergarten enrolment in Vancouver is now about 95% of the available age-group and in Victoria it is about 70%. It is a smaller but rapidly increasing proportion in 41 other school districts.

In 1958, [Chap. 42, Sec. 163 (b)] the minimum age was changed to ".... one year younger than the age required for admission to Grade I", i.e. the age became 4.67 instead of 4.00, thus excluding nursery school pupils. Since 1961 a minimum enrolment of 25 children of the required age (4.67+) has been required, (the Superintendent's approval also was still necessary in 1961) and ".... but not more than one-half of the essential operating expenses thereof shall be included in or approved as essential operating expenses for the purposes of Sec. 182". [Chap. 319, Sec. 163 (b)]. This limitation on the grants is still in effect although the approval required from the Superintendent of Education was dropped when Sec. 8 (d) was repealed in March, 1962.

Table I:- B.C. Public School Kindergarten Enrolment

School Year	S.D. 39 Vancouver	S.D. 61 Victoria	Provincial Total
Oct. '67	5,786	1,792	15,368
1966-67	6,299	1,736	14,671
1965-66	6,373	1,778	13,080
1960-61	2,002	1,026	3,850
1955-56	574	555	1,969
1950-51	381	511	1,215
1945-46	213	211	507
1944-45	96	164	260

Notice that the decreasing urban birth rates have begun to have an effect on kindergarten enrolment in Vancouver, although they have not yet affected other school districts. The available 5-year-old population in Greater Victoria is between 2500 and 2600.

BACKGROUND OF THE STUDY

The study on the following pages is one that was reported in condensed form by the Royal Commission on Education ("the Chant Commission")[10] in 1960. It actually began before the Royal Commission was established, a Departmental Committee[11] having been set up in the fall of 1958, at the request of the Hon. the Minister of Education, to investigate the value of public-school kindergartens. By the time the preliminary investigation was completed, however, the Royal Commission was evaluating the effectiveness of B.C. schools at all levels. Therefore the report of the Committee was submitted to the Commission and became an integral part of the latter's investigation of B.C. schools.

As the Committee began its preliminary work and began to collect studies conducted elsewhere it was noted that almost all of them had certain characteristics:

(a) they were carried out by persons who might be expected to be favourably inclined toward the establishment of kindergartens.

(b) the purposes of the investigations were pre-announced.

(c) the studies lacked adequate controls, or if control techniques were adopted, e.g. by matching of pupils, the numbers of pupils involved were very small.

(d) many studies of "children" ignored sex differences at the primary level although other studies indicate that vast differences exist.

We do not wish to criticize research studies made by others without noting some of the deficiencies of the present study. It should be noted at this point that the Committee realized at the start that socio-economic status of the pupils was an important factor that was being neglected. And later investigation of the data indicated that in spite of the population of 22,000 seeming to be large, some of the sub-groups, e.g. of low-mental-age Grade II boys who had attended public kindergarten, were quite inadequate in size to provide significance. Also, even some of the largest groups are not as well matched as might have been hoped.

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(10) Chant, S.N.F.; Liersch, J.E.; and Walrod, R.P.: Report of the Royal Commission on Education, Province of British Columbia, Pp. 118-127. 1960: Queen's Printer, Victoria, B.C.

(11) F.P. Levirs, chairman; B.A. Barr, secretary and librarian; C.B. Conway, E.E. Hyndman and J.R. Meredith. Mr. Levirs was responsible for overall direction of the study and the preparation of the report, Mr. Barr for collation of literature in the field and Dr. Conway for the research investigations. General observations from the Committee's report to the Commission and the Commission's recommendations are given on pp. 126-127, loc. cit.

Other limitations are that no investigations were made of the effect of class size (usually 30 in Victoria and 25 in Vancouver) or of total attendance (usually quarter time in Victoria and half time in Vancouver) in relation to private kindergartens where the total time per pupil usually was greater. Pupils who attended private kindergartens and then continued in private schools also were not covered.

Nevertheless the Committee did succeed in conducting an investigation of public kindergarten, private kindergarten and non-kindergarten children that involved relatively large numbers of children in public-school primary grades and that was completely "blind", i.e. not a single person outside of the committee and the superintendents of schools heard the word "kindergarten" mentioned until all data, ratings and other information were collected. It should therefore be relatively free from pro- or anti-kindergarten bias.

The study concerns 22,000 public-school children in the primary grades who had, or had not, attended public or private kindergartens in previous years. It was restricted to School District 39, Vancouver, where the 1958-59 public kindergarten enrolment was 1,735, and School District 61, Victoria, where the public kindergarten enrolment was 981. Both had well-organized and well-supervised systems.

On the following pages the effect of kindergarten attendance is studied in relation to:

(1) Report-card ratings in Grades I to III.

(2) Adaptation to the school situation.

(3) Intelligence.

(4) Achievement in Grade II (Victoria only).

(5) Retardation and acceleration in Grades I to III.

The following numbers of pupils were involved:

	Grade I			Grade II			Grade III			Total
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total	Primary
S.D. 61	1,051	895	1,946	1,033	932	1,965	962	850	1,812	5,723
S.D. 39	3,091	2,808	5,899	2,818	2,574	5,392	2,722	2,562	5,284	16,575
	4,142	3,703	7,845	3,851	3,506	7,357	3,684	3,412	7,096	22,298

No investigation of home backgrounds or other environmental factors affecting kindergarten and non-kindergarten children was carried out and it is quite possible that parental attitudes which result in kindergarten attendance or auto-selection from certain economic groups may also result in higher achievement and better report-card ratings.

ABSTRACT AND SUMMARY

1. Report-Card Ratings

Report-card ratings in Work Habits, General Behaviour and Health Habits of 22,298 S.D. 39 and 61 primary pupils were collected and analysed. Somewhat less than half the pupils had attended public or private kindergartens.

The K (Public) and Pr K (private) kindergarten children were distributed through Grade I classes in what appeared to be a random manner. Only 3 out of 277 Grade I classes were composed entirely of kindergarten-trained children.

Report-card ratings issued by many teachers were of limited range, particularly in Health Habits. Some had issued no ratings other than "N" (Normal). Practice differed in Victoria and Vancouver, with the latter generally having a much broader dispersion. All distributions were skewed, as almost all teachers leaned in the favourable direction and granted more O's and G's than S's and U's.

Teachers' ratings generally were higher for pupils who had attended private kindergartens. It was noted, however, that the ratings followed the same pattern as the high to low mental-age ratios. The results also might bear less relation to whether the kindergartens were public or private than to the number of days of kindergarten attendance (assumed to be higher in private institutions), and to the fact that larger proportions of Pr K children were located in Vancouver where the dispersions of ratings were greater.

Girls' achievement scores were higher than boys'. Girls also obtained much higher report-card ratings and the sex differences increased from Grade I to Grade III.

2. Adaptation to School

Teachers who were required to select pupils who were best and least well-adapted to the school situation did so with considerable success, even when they had not discriminated among pupils in terms of report-card ratings.

Again, much higher ratings were given to girls than to boys but the differences did not increase from Grade I to Grade III to as great an extent as report-card ratings.

In the opinion of the primary teachers,
over 60% of the well-adapted pupils are girls
and 70% of the poorly-adapted pupils are boys.

"Adaptation to School" as interpreted by the Grade II teachers in S.D. 61 was related to Mental Age and was closely related to the results of achievement tests administered 1½ months after the pupils had been rated.

Nevertheless, adaptation to school does seem to be related to kindergarten attendance. In 10 out of 12 groups of both sexes the adaptation ratios of those who had attended public or private kindergarten were higher than those who had attended neither. The exceptions were Grade III pupils who had attended private kindergarten.

Non-kindergarten children of both sexes showed a steady improvement from Grade I to Grade III, as did public kindergarten girls. Private kindergarten children of both sexes, although selected as best adapted in Grade I, showed a progressive decrease in adaptation. As a result, their adaptation ratios in Grade III were lower than both public kindergarten and non-kindergarten groups and this cannot be ascribed to regression toward the mean.

3. Intelligence

An investigation of Grade II pupils in School District 61 showed all groups had approximately the same average Mental Age, with the exception of the private kindergarten girls who showed a slight superiority.

I.Q.'s, however, differed in the order: Pr K/ K/ Non K pupils because the Pr K's and K's were slightly younger than the Non K pupils.

Three mental-age groups, high, modal and low, were set up for comparisons of achievement.

4. Achievement in Grade II

Standardized achievement tests that were administered in January, 1959 to all S.D. 61 Grade II pupils provided scores in Reading Comprehension, Word Meaning, Spelling and Arithmetic.

Means were determined for nine sub-groups of each sex divided according to mental age and kindergarten attendance. In 34 out of 36 comparisons, girls exceeded boys of similar mental age.

Kindergarten attendance was related to higher average scores in all four Grade II subjects, the order in each case being Pr K/ K/ Non K.

The achievement of private kindergarten Grade II pupils was highest among those in Modal and High M.A. groups but not in the dullest group. Public kindergarten pupils of low M.A. were higher in three out of four subjects, the exception being Arithmetic.

5. Retardation and Acceleration

Very little acceleration was found in the first three grades but whatever was evident was related chiefly to private kindergarten attendance.

Retardation in all three grades was considerably lower for pupils who had attended kindergarten. At the Grade I and II level it was least for public kindergarten attenders, at the Grade III level for ex-private kindergarten pupils.*

* A later study, conducted at the Grade VII level, showed lower average chronological ages, in relation to mental ages, for pupils of both sexes who had attended public kindergartens; for boys only who had attended private kindergartens. The Pr K Grade VII girls did not have the greater acceleration that was noticed in the primary grades.

The reduction in retardation was the most obvious finding when the effect of kindergarten attendance was investigated in the final grade of elementary school. A slight superiority in achievement was indicated for those of both sexes who had attended kindergartens of either type when the Grade VII pupils were divided into equivalent mental age groups. The differences between the means were very small but the persistence of the small differences indicated that a general relationship existed. Speculation is permissible as to the possible effect if full advantage had been taken in the primary grades of previous kindergarten attendance. As a considerable amount of retardation was evident and very little acceleration it is obvious that few of the better adapted pupils were encouraged to proceed at their own rate.

PROCEDURE

Many previous studies seem to have been conducted by investigators who might be expected to be biased toward the value of kindergarten attendance. The results of such studies may possibly have been influenced by the way that the information was collected. Therefore it was decided to conduct a "blind study", i.e. to withhold information as to the nature of the investigation until preliminary data had been received.

Lists of Grades I, II and III pupils were obtained from the teachers in duplicate on class record forms headed "General Development - Primary Grades". Teachers recorded the sex and the symbols O, G, N, S or U given each pupil in three general fields on the first (fall) report issued in November or December.

As one of the chief objectives of kindergarten training is said to be socialization or adaptation to the group situation, on one copy teachers were asked to:

(a) "Underline in blue or green the names of the five pupils who have been most successful this year in adapting themselves to the school situation, in adjusting, or in cooperating with classmates and teachers.

(b) "Underline in red the names of the five pupils who have been least successful in adjustment, who were most upset by the new school situation or about whom you have been most concerned."

Attention was called to the fact that socialization was intended, not intelligence, not readiness, not achievement as estimated or determined from test results; also that this was a "forced choice" which had to be made without regard to the number of high or low report-card grades that had been assigned.

Up to this point the word Kindergarten had not been mentioned.

After the underlined records had been collected, the other copy was returned for further information. Teachers were asked to:

mark R: (Grade I) all children who began Grade I in a previous school year.

(Grades II and III) all children who have respectively taken more than the normal time to reach their present grade level (i.e. think of "R" as "repeated" even though slow learners may not actually have repeated any of their work).

mark A: (accelerated) all children who have taken less than the normal time to reach their present grade placement. (Most of these will be pupils in their second year of public school who will complete Grade III this year.)

mark K: all those who previously attended a public school pre-primary or kindergarten class.

mark Pr K: all those who attended a privately operated kindergarten, if known. (Some students might be marked both "R" and "K", "A" and "Pr K", "R" and "Pr K", etc.)

The order in which the information was collected would eliminate the effect of bias of primary teachers toward or against Kindergarten training except possibly in the case of acceleration and retardation.

Some studies, e.g. that of Church[12] (Toronto) and Safran[13] (Calgary) do not mention the sex of the pupils. Others, e.g. Gillespie[14] (Vancouver) mention the numbers involved but ignore possible differences. As distinct differences in the achievement of the sexes have been noted in Grade I it seemed logical to investigate influences that might originate at the kindergarten level. Therefore boys and girls have been dealt with separately throughout this study.

Intelligence test scores and achievement test scores for Grade II pupils in S.D. 61 were obtained from the Greater Victoria Department of Tests and Measurements. By classifying pupils according to mental age and kindergarten attendance, it was possible to determine possible continuing effects of such attendance on the achievement of groups that were equivalent in mental age two years later.

Acceleration and retardation in the primary grades also is reported, although many of the accelerated sub-groups are too small for reliable comparisons to be made.

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(12) Church, E.J.M.: "An Evaluation of Preschool Institutions in Canada." Canadian Education, V, 3, June, 1950, pp. 14-46.

(13) Safran, Carl: A Study of the Value of Kindergarten Training in the Calgary Public School System. Mimeo'd. Calgary School Board; Calgary, Alta. 1953. Pp. 26.

(14) Gillespie, Verna Grace: The Effect of Kindergarten Training on Achievement in Reading and Arithmetic in Grade II. Unpublished M.Ed. Thesis, University of Washington; Seattle, Wash. 1958. Pp. 38.

Attendance at Kindergarten

In neither city were kindergartens operated in all elementary schools and limitations of accommodation precluded admission of all children whose parents applied. Admission was on a first-come, first served basis until applications exceeded capacity, after which age was the criterion. Sex was not considered as a basis for admission. Depending upon the number of applications, half-day, and half-day-alternate-weeks attendance was possible and not all kindergarten children in this study will have attended for the same number of half-days before admission to Grade I. Pupils who had attended private kindergartens probably had a much higher total attendance. None of the public-school pupils will have attended for a full day. Many of the private-school pupils will.

The proportions of Grade I pupils who had previously attended public and private kindergartens in the two cities were as follows:

Table II:- Pre-Grade I Attendance at Public and Private Kindergartens

		Grade I Enrolment	Previously Attended Kgn.		Previously Attended Priv. Kgn.		No attendance K or Pr K	
			No.	%	No.	%	No.	%
S.D. 61	Boys	1,062	401	38	179	17	482	45
	Girls	866	319	37	143	17	404	47
	Total	1,928	720	37	322	17	886	46
S.D. 39	Boys	3,114	762	24	675	22	1,677	54
	Girls	2,827	724	26	618	22	1,485	53
	Total	5,941	1,486	25	1,293	22	3,162	53

When School Districts 61 and 39 are compared, it is noticeable that a lower proportion attended public kindergartens in Vancouver and a higher proportion attended private kindergartens. There is no evidence of selection by sex in either type of kindergarten.

Distribution of Kindergarten Children in Grade I Classes

Residences of kindergarten children do not necessarily coincide with elementary-school attendance areas, but it might be expected that where kindergartens were in operation and were attended by half the Grade I pupils, pupils would be assigned to classes on the basis of kindergarten attendance during the first term of Grade I. The assumption might be made that in socialization and readiness for formal instruction the kindergarten children would have reached a more advanced level.

The evidence indicates that in neither city were children placed in Grade I classes generally on the basis of kindergarten attendance, there being only three Grade I classes out of 277 which were composed entirely of kindergarten attenders and only twelve in which previous attendance exceeded 90%. The following distributions are slightly bimodal, but, in general, they indicate that the distribution of kindergarten and non-kindergarten attenders was usually random.

Table III:- Enrolment in Grade I Classes According to Kindergarten Attendance

% of Grade I Children who had attended Public or Private Kgn's.	Number of Classes		
	S.D. 61	S.D. 39	Total
100	1	2	3
90+	3	6	9
80	8	17	25
70	8	23	31
60	12	25	37
50	10	25	35
40	7	21	28
30	8	27	35
20	5	33	38
10	1	17	18
0+	5	13	18
	68	209	277

RELATIONSHIP OF KINDERGARTEN ATTENDANCE TO REPORT-CARD GRADES

Report-Card Ratings

The standard B.C. Primary Report card permitted entries to be made in five categories in three general fields as well as the usual grading of subject-matter. Categories were:

O	Outstanding		
G	Good	in the fields	Health Habits
N	Normal	of	General Behaviour
S	Slow but satisfactory		Work Habits
U	Unsatisfactory		

In a study of this type one could make a superficial report of favourable and unfavourable report-card ratings for K and Non K pupils in terms of numbers or per cents in different grades. To do so, however, would invite the drawing of erroneous conclusions, as several extraneous factors could influence the data:

Distributions of ratings: As the range of the ratings increases the proportions of both high and low ratings will increase. Similarly, if the ratings of the total group are raised, the ratings of a majority of the sub-groups also will be raised.

Sex: If girls tend to be rated more highly than boys, the ratings will improve as the proportion of girls increases.

Proportions falling in different groups: If the proportions of kindergarten children decrease one should not be surprised to find the kindergarten children being assigned smaller proportions of either favourable or unfavourable ratings.

Unreliability: Standard errors in general vary inversely as the square root of the number of cases. Consequently, even though the original number of pupils may be large, comparison of small proportions of the total receiving certain ratings may give unreliable results.

Heterogeneity: If the total group is a composite of smaller groups with different characteristics and the whole group is broken down into different categories, the proportions in the sub-groups will change rapidly as the ratings of the whole group are raised or lowered.

Distribution of Ratings

As the Grades I to III ratings were those of the first fall report, after only about three months in the class, not much subject-matter data would be available to the teachers. If teachers were able to discriminate subjectively in each general field, however, and the pupils were normally distributed, the ratings would be expected to be distributed as follows:

O: 5% G: 20% N: 50% S: 20% U: 5%

The actual distributions for the 22,298 primary pupils were:

Health Habits	3.4	23.7	69.2	3.1	.6
General Behaviour	4.2	25.5	61.0	7.3	2.1
Work Habits	3.9	22.6	53.5	15.6	4.4

In each case the distribution of ratings is skewed; there are far more G's than S's. Teachers lean in the favourable direction. It is also notable that the difficulty of separating children on the five-point rating scale results in fewer O's, and considerably fewer U's than the theoretical distribution. The nearest approach to the theoretical is found in the "Work Habits" ratings which probably are influenced by classroom achievement.

Ratings by District

Differences in spread of ratings between Vancouver and Victoria are difficult to explain, but probably are a matter of administrative policy rather than heterogeneity of the population. In each primary grade the dispersion of ratings in Vancouver exceeded that in Victoria, although there was a slight tendency in Victoria to give more "U's".

% of total of Primary Grades rated:		O	G	N	S	U
Health Habits	District 61	.8	14.9	81.9	1.7	.7
	District 39	4.2	26.7	64.8	3.7	.6
General Behaviour	District 61	.9	20.2	71.0	5.4	2.5
	District 39	5.3	27.3	57.5	7.9	2.0
Work Habits	District 61	1.2	18.8	59.4	15.0	5.6
	District 39	4.8	23.8	51.4	15.9	4.0

Table IV:-
Ability of Teachers to Discriminate among Pupils on a Five-Point Scale

	Per Cent of Total Classes								
	S.D. 61			S.D. 39			Total		
	Health Habits	Gen'l. Behav.	Work Habits	Health Habits	Gen'l. Behav.	Work Habits	Health Habits	Gen'l. Behav.	Work Habits
Grade III classes:									
with no O's, G's	43	29	25	22	6	3	27.5	12.5	8.8
no S's, U's	71	49	12	63	29	11	65.0	34.2	11.3
100% N's	31	12	5	19	3	0	22.5	5.4	1.3
Grade II classes:									
with no O's, G's	59	37	33	24	9	7	34.0	17.0	12.5
no S's, U's	75	44	14	57	37	14	61.9	38.9	13.6
100% N's	47	22	1	22	7	1	29.1	11.3	1.1
Grade I classes:									
with no O's, G's	57	28	16	29	14	11	36.4	17.1	12.0
no S's, U's	75	28	7	48	23	9	54.5	24.0	8.4
100% N's	49	10	1	20	5	.5	26.9	6.2	.7

The Table shows the per cent of classes or divisions in which the teacher failed to assign any O's and G's, i.e. gave no superior ratings; no S's and U's, i.e. gave no inferior ratings; and did not discriminate at all, i.e. gave a grade of N (sometimes G) to all pupils. The difference between Districts 61 and 39 and the descending order of range of discrimination: Work Habits/General Behaviour/Health Habits are evident at all levels.

In this Table no consistent trend is noticeable for range of ratings to increase as the pupils go through the primary grades. A slight trend of this type in the cases of General Behaviour and Work Habits and a tendency for the ratings to become more favourable from Grades I to III can be observed in the Summary of Report-Card Grades, (page 43, Appendix II).

The importance to this study of the failure of some teachers' ratings to discriminate among their pupils is obvious. Teachers who do not discriminate at all cannot discriminate between the kindergarten and non-kindergarten children. Therefore it would be extremely difficult to find differences from their report-card grades.

Report-Card Ratings by Sex:

Several years ago it was noticed that the retardation of Grade I boys was 50% higher than that of girls in B.C. and that the sex differences in achievement became greater as pupils went up through the elementary and junior-high-school grades. For this reason, boys and girls have been dealt with separately throughout this study.

None of the classes under investigation was composed entirely of boys or of girls. But teachers' report-card ratings in the three fields showed sex differences that were highly significant. In every case the ratings were more favourable for the girl pupils.

The M/F sex ratios were: Gr. I: 1.12 Gr. II: 1.10 Gr. III: 1.08. (As girls received higher ratings and the proportion of boys decreased in the upper primary grades, ratings might be expected to increase slightly from Grade I to Grade III.)

The M/F ratios also were: K: 1.08 Pr K: 1.09 Non K: 1.12. (As influenced by sex, ratings should be least favourable for the Non K group which included the largest proportion of boys.)

Table V:- Report Card Ratings by Sex in the Primary Grades

			Teachers' Ratings % of Pupils					Number of Pupils
			O	G	N	S	U	
Health Habits	Grade III	boys	2.0	19.7	73.1	4.5	.7	3,684
		girls	5.1	33.7	59.4	1.4	.4	3,412
	Grade II	boys	2.2	17.6	75.3	3.6	1.4	3,851
		girls	4.5	29.6	64.2	1.5	.2	3,506
	Grade I	boys	2.3	18.6	73.7	4.7	.7	4,142
		girls	4.5	24.7	67.7	2.8	.3	3,703
General Behav'r.	Grade III	boys	2.4	19.7	62.2	12.2	3.4	3,684
		girls	6.9	36.2	51.6	4.2	1.0	3,412
	Grade II	boys	2.6	18.3	66.8	8.9	3.4	3,851
		girls	6.3	32.5	57.5	3.0	.7	3,506
	Grade I	boys	2.5	19.7	64.8	10.0	3.0	4,142
		girls	4.9	28.4	61.4	4.5	.8	3,703
Work Habits	Grade III	boys	2.1	17.1	53.6	21.1	6.1	3,684
		girls	6.7	33.1	49.0	9.0	2.1	3,412
	Grade II	boys	2.6	16.0	55.8	19.1	6.4	3,851
		girls	5.6	29.4	53.1	9.7	2.2	3,506
	Grade I	boys	2.4	16.3	53.5	21.6	6.2	4,142
		girls	4.5	25.6	55.2	11.7	3.0	3,703

Report-Card Ratings and Kindergarten Attendance

The following three Tables compare the report-card ratings of pupils in Grades I, II and III who had or had not attended public or private kindergartens. The procedure that was used was to find the per cents of each group granted favourable (O and G) and unfavourable (S and U) grades, and to compare these in the form of a ratio, $\frac{O + G}{S + U}$. The ratio would be 1.00 if equal proportions of the group, for example: Grade III Non K boys, were assigned to the favourable and unfavourable categories. In Work Habits it will be noticed that boys' ratios are invariably lower than 1.00, while girls' are invariably higher. This indicates that boys and girls were not rated against others of like sex but against a class composite standard which resulted in an excess of unfavourable ratings for boys.

In General Behaviour and Health Habits, average ratings were higher and almost all group ratios exceed 1.00, but again the boys' ratings, and consequently their ratios, were far below the girls'.

The following Tables must be interpreted with considerable caution. We may conclude that girls' report-card ratings are far higher than boys' and that the sex differences increase through Grades I to III in terms of teachers' ratings.

But, when we compare different groups we are very likely to jump to erroneous conclusions.

For example, (1): In going from Grade I to Grade III it would seem that girls of all sources improved much more than boys. Actually, however, this can be merely the statistical result of an increase in the ratings and the dispersion of ratings combined with the treatment of a group that is heterogeneous in sex as if it were a single distribution. The numerical difference between boys' and girls' or K and Non K ratings may be greater for General Behaviour than for Work Habits but that does not mean that a greater absolute difference exists. It may merely be the result of a shift in the whole distribution. (As the girls' ratings are generally higher, the elevation of pupils from the normal or "N" group to the superior or "O + G" group will result in the elevation of more girls than boys. Not only will the per cent's of O's and G's be raised for all girls' groups, but the ratios of "O's + G's" to "S's + U's" will be increased because the dispersion of the ratings has increased.) (See the Table on Page 20.)

Table VI:-
Kindergarten Attendance and Report-Card Grades for Health Habits

Per Cent of K, Pr K and Non K Pupils in Grades I to III
Assigned Report-Card Grades of "O" and "G" in Health Habits

	Boys			Girls		
	I	II	III	I	II	III
K	18.8	16.7	16.7	27.2	28.0	36.1
Pr K	25.8	26.3	21.2	34.7	42.0	42.7
Non K	18.9	18.1	21.0	28.6	33.5	37.0
Total Pupils	4,311	3,883	3,726	3,687	3,522	3,410
O and G Grades	872	762	762	1,086	1,203	1,299
% O and G	20.2	19.6	20.5	29.5	34.2	38.1

Per Cent of K, Pr K and Non K Pupils in Grades I to III
Assigned Report-Card Grades of "S" and "U" in Health Habits
(Figures in parentheses involve fewer than 50 pupils)

	Boys			Girls		
	I	II	III	I	II	III
K	4.2	(3.6)	(3.9)	(2.8)	(1.3)	(.8)
Pr K	(2.9)	3.5	(5.8)	(1.5)	(1.1)	(1.5)
Non K	6.5	6.0	5.1	3.8	(2.0)	(2.1)
S and U Grades	223	192	190	112	59	61
% S and U	5.2	4.9	5.1	3.0	1.7	1.8

Ratio: O+G/S+U Report-Card Grades by Grade, Sex and Kgn. Attendance

	Boys			Girls		
	I	II	III	I	II	III
K	4.5	(5.6)	(4.3)	(9.7)	(21.5)	(45.1)
Pr K	(8.9)	7.5	(3.7)	(23.1)	(38.2)	(28.5)
Non K	2.9	3.0	4.1	7.5	(16.8)	(17.6)
Total $\frac{O + G}{S + U}$	3.9	4.0	4.0	9.8	20.1	21.2

Table VII:-
Kindergarten Attendance and Report-Card Grades for General Behaviour

Per Cent of K, Pr K and Non K Pupils in Grades I to III
Assigned Report-Card Grades of "O" and "G" in General Behaviour

	Boys			Girls		
	I	II	III	I	II	III
K	20.9	18.4	17.4	30.7	33.8	40.2
Pr K	25.5	25.3	22.3	35.9	46.5	46.4
Non K	22.3	19.8	22.4	33.3	38.4	42.6
Total Pupils	4,209	3,884	3,693	3,704	3,619	3,439
O and G Grades	950	805	801	1,226	1,417	1,481
% O and G	22.6	20.7	21.7	33.1	39.2	43.1

Per Cent of K, Pr K and Non K Pupils in Grades I to III
Assigned Report-Card Grades of "S" and "U" in General Behaviour

	Boys			Girls		
	I	II	III	I	II	III
K	11.9	12.5	18.6	6.3	4.6	4.8
Pr K	12.2	12.1	16.7	4.1	3.6	5.2
Non K	12.8	11.9	14.9	5.5	3.5	5.4
S and U Grades	523	470	582	201	135	181
% S and U	12.4	12.1	15.8	5.4	3.7	5.3

Ratio: O+G/S+U Report-Card Grades by Grade, Sex and Kgn. Attendance

	Boys			Girls		
	I	II	III	I	II	III
K	1.8	1.5	.9	4.9	7.3	8.4
Pr K	2.1	2.1	1.3	8.8	12.9	8.9
Non K	1.7	1.7	1.5	6.1	11.0	7.9
Total $\frac{O + G}{S + U}$	1.8	1.7	1.4	6.1	10.5	8.2

Table VIII:-
Kindergarten Attendance and Report-Card Grades for Work Habits

Per Cent of K, Pr K and Non K Pupils in Grades I to III
Assigned Report-Card Grades of "O" and "G" in Work Habits

	Boys			Girls		
	I	II	III	I	II	III
K	19.9	15.5	17.6	30.2	31.2	37.4
Pr K	21.0	21.2	21.0	34.8	41.5	44.3
Non K	17.2	18.0	18.7	27.9	34.2	39.2
Total Pupils	4,171	3,867	3,739	3,760	3,521	3,425
O and G Grades	781	704	711	1,129	1,238	1,370
% O and G	18.7	18.2	19.0	30.0	35.2	40.0

Per Cent of K, Pr K and Non K Pupils in Grades I to III
Assigned Report-Card Grades of "S" and "U" in Work Habits

	Boys			Girls		
	I	II	III	I	II	III
K	26.7	24.4	27.0	13.0	10.7	12.0
Pr K	24.4	25.1	29.0	10.8	10.2	9.9
Non K	29.3	26.3	26.7	16.9	12.3	11.0
S and U Grades	1,149	991	1,019	545	404	374
% S and U	27.5	25.6	27.3	14.5	11.5	10.9

Ratio: O+G/S+U Report-Card Grades by Grade, Sex and Kgn. Attendance

	Boys			Girls		
	I	II	III	I	II	III
K	.75	.64	.65	2.32	2.92	3.12
Pr K	.86	.84	.72	3.22	4.07	4.47
Non K	.59	.68	.70	1.65	2.78	3.56
Total $\frac{O + G}{S + U}$	.68	.71	.70	2.07	3.06	3.67

(2) A study of Grade II mental ages that appears later in this report shows no appreciable difference in Mean M.A.'s except in one category: there is superiority among Pr K girls. But when each distribution of M.A.'s is examined independently and is divided into three categories: high, medium and low, an additional fact emerges. The rank order of the ratios of high to low Mental Ages is identical to the ratios of "O + G" to "S + U" report-card grades in Work Habits and almost identical to those assigned by the teachers in General Behaviour.

Table IX:- Ratios of High (8-6 +) to Low (7-5 -) Mental Ages (S.D. 61 only) and High (O+G) to Low (S+U) Teachers' Ratings for Work Habits and General Behaviour by Kindergarten Attendance and Sex

	Grade II Boys			Grade II Girls		
	Hi/Low M.A.'s	Hi/Low Work Habits	Hi/Low Gen. Behav.	Hi/Low M.A.'s	Hi/Low Work Habits	Hi/Low Gen. Behav.
K	1.62	.64	1.6	2.49	2.92	7.3
Pr K	2.26	.84	1.9	4.40	4.07	12.9
Non K	1.84	.68	1.7	2.39	2.78	11.0

We may conclude that Work Habits and General Behaviour are closely related to Mental Age in Grade II, or that teachers' high and low report-card ratings in those fields are strongly influenced by the high and low M.A.'s of pupils.

(3) The ratios of high/low report-card ratings are higher for Pr K than K and Non K pupils in each field and at each grade level. But when we look back at the Tables previously presented we notice that:

(a) Larger proportions of the Pr K and Non K pupils were located in Vancouver.

(b) The dispersion of ratings was greater in Vancouver.

(c) A relatively larger proportion of the K pupils was located in Victoria where the dispersion of ratings is small.

This tends to exaggerate the differences in favour of the Pr K's and against the K and Non K pupils.

Conclusions that can be drawn from the Table on report-card ratings on Health Habits are subject to additional restrictions:

(1) The dispersion was largely due to School District 39 (82% of all Health Habits ratings were "N" in School District 61).

(2) S.D. 39 had a much higher proportion of Pr K pupils.

(3) The distributions were much more strongly skewed and one-half to two-thirds of the classes had no 'S' and 'U' ratings.

(4) The number of low ratings, particularly of girls, usually was so small that the reliability of differences is doubtful in spite of the large total number of pupils, and again, (5) the relationship of the ratios to high/low mental age is evident.

The effect of these is greatly to exaggerate the differences between K, Pr K and Non K groups, particularly in the Pr K category. In the latter case, the size of the ratios is largely a statistical artifact.

Therefore, while the general picture of the assignment of ratings has been honestly presented, it is impossible, without further analysis of the factors, to draw final conclusions as to the value of Kindergarten attendance from the data provided by report-card ratings of pupils. We do not wish to be guilty of reporting "differences that are significant at the .01 level" that are merely methodological and statistical differences. (See the 'Note on the Significance of Differences' in the Appendix, pp. 44-45.)

(In this discussion, no implication is intended that Health Habits, General Behaviour, etc. do not improve from Grade I to Grade III, or that differences do not exist between K, Pr K and Non K pupils. Attention is merely being drawn to the fact that the method of reporting, the heterogeneity of the population, and the elevation of the ratings make it impossible for differences in report-card ratings not to be exaggerated. Differences due to lack of homogeneity in mental age, sex, dispersion of ratings, etc. could seem to be differences between K, Pr K and Non K pupils because of the method of categorization that is used.

The forced-choice method of classifying pupils according to their adaptation to school, as presented in the section that follows, removes some of these difficulties. Although it does not eliminate differences due to sex it causes ratings to be competitive within each class and produces the same numbers of high and low ratings. As several teachers have pointed out, the five "least well adapted" pupils in a class are not necessarily "poorly adapted" and there may be big differences between classes in absolute terms. It does, however, remove the fictitious differences between K, Pr K and Non K pupils that are due to grade level and differences in reporting in S.D.'s 39 and 61.)

RELATIONSHIP OF KINDERGARTEN ATTENDANCE TO ADAPTATION TO THE SCHOOL SITUATION

All teachers, including those who had given all of their pupils the same report-card rating, were required to select the five best and the five least well adapted children as defined on Page 13 of this study. This method of selection has been found to have a definite effect on the results that were obtained.

Sex Differences in Adaptation

Sex differences are indicated in the "forced choice" selection of well-adapted and poorly-adapted children that are even more significant than those shown by report-card grades.

In the opinion of the primary teachers,

over 60% of the well-adapted pupils are girls
about 70% of the poorly-adapted pupils are boys

about twice as many boys are poorly-adapted as well-adapted
about twice as many girls are well-adapted as poorly-adapted

Although a close relationship of School Adaptation to Report-Card Grades might be expected, there are some notable differences from the results based on report-card grades in Health Habits, Work Habits and General Behaviour. First to be noticed is that the relative improvement of the girls is slight and no significant change occurs in the sex ratios or relative adaptation of the two sexes from Grade I to Grade III. This shows that the attitude of teachers toward the two sexes as formed in Grade I is relatively constant through the primary grades, and indicates that the extensive "improvement" of girls' report-card grades from Grade I to Grade III was almost certainly due to heterogeneity and the higher ratings given to the total group.

Table X:- Sex Differences in Adaptation to School

		Poorly Adapted			Well Adapted		
		M	F	Total	M	F	Total
Grade III	S.D. 61	214	86	300	108	182	290
	S.D. 39	562	254	816	306	525	831
	Total	776	340	1,116	414	707	1,121
	% M or F	69.5	30.5		36.9	63.1	
	% of own sex	21.1	10.0		11.2	20.7	
Grade II	S.D. 61	192	93	285	107	183	290
	S.D. 39	600	255	855	316	539	855
	Total	792	348	1,140	423	722	1,145
	% M or F	69.5	30.5		36.9	63.1	
	% of own sex	20.6	9.9		11.0	20.6	
Grade I	S.D. 61	214	88	302	128	175	303
	S.D. 39	665	327	992	382	612	994
	Total	879	415	1,294	510	787	1,297
	% M or F	67.9	32.1		39.3	60.7	
	% of own sex	21.2	11.2		12.3	21.3	

Adaptation vs. Age and Achievement

An indication of what is being measured by the teachers in their forced-choice selection of pupils who were well and poorly "adapted" is given in the following Table, which is based on the results of the tests administered to Grade II throughout S.D. 61. It will be noticed that Adaptation bears little relation to Chronological Age, but a high relation to Mental Age and achievement test results. As the Adaptation reports were collected 1½ months before the tests were administered, it is obvious that to the teacher "Adaptation" is a forecast of likelihood of success in school subjects.

Table XI:-

Adaptation to School vs. Mean Chronological and Mental Age, Grade II, S.D. 61

	Adaptation of Boys			Adaptation of Girls		
	Low	Medium	High	Low	Medium	High
Mean C.A.	7-8	7-8	7-9	7-8	7-7	7-7
Mean M.A.	7-11	8-1	8-4	7-11	8-1	8-5
N	181	705	86	83	626	181

Table XII:-

Adaptation to School vs. Achievement, Grade II, S.D. 61

	Adaptation of Boys			Adaptation of Girls		
	Low	Medium	High	Low	Medium	High
Reading Comprehension	19.1	22.0	29.7	24.7	25.9	31.9
Word Meaning	16.5	19.2	24.3	20.4	21.7	25.3
Spelling Errors	19.5	13.5	6.8	13.5	9.7	5.9
Arithmetic	40.4	45.4	51.7	42.7	45.8	51.0

In the Tables above, "Medium" adaptation refers to the group of pupils not selected among the five best or five least well adapted. It constitutes somewhat more than two-thirds of the total enrolment.

Achievement is reported in terms of mean scores for each group. (See pp. 34-37).

Effect of Kindergarten Attendance on Adaptation

In dealing with this data pupils were classified in 54 categories: those who were well adapted, poorly adapted, or not classified as either; three types of kindergarten attendance, public, private and none; two sexes; and in the three primary grades.

The effect of public and private kindergarten attendance and non-attendance may be clarified by the use of an adjustment or adaptation index or ratio. The index is the difference between the per cents well and poorly adapted in each group, e.g. Grade II, private kindergarten, boys. The ratio gives the same information as the index but in the form: $\frac{\%\text{ well adapted}}{\%\text{ poorly adapted}}$. Negative indexes indicate an excess of poorly-adapted pupils in the group. This is characteristic of the boys. Positive indexes indicate an excess of well adapted pupils which is characteristic of the girls. They are given for all groups and grades in Appendix I (Pages 40-42). The adaptation ratios are all positive, with those below 1.0 indicating larger proportions of poorly adapted pupils, and those above 1.0 well adapted pupils. The ratios of boys' groups were all below 1.0, while those of girls were all above 1.5. A summary of the adaptation ratios of the three groups and grades is given in the following Table.

Table XIII:-
Adaptation Ratios (Proportions in Well Adapted/Poorly Adapted Groups)

Grade:	Boys			Girls		
	I	II	III	I	II	III
Public Kindergarten	.70	.54	.72	1.97	2.13	2.61
Private Kindergarten	.80	.60	.41	2.64	2.03	1.89
Non-Kindergarten	.45	.52	.56	1.55	1.97	2.05
Totals	.58	.54	.54	1.84	2.02	2.10

(N.B. the trends in the adaptation of Private Kindergarten pupils and Non-Kindergarten pupils of both sexes.)

Conclusions that may be drawn from the Table regarding the relationship of kindergarten attendance to adaptation to the school situation are (remembering that pupils have not been equated for intelligence or home background and that the forced-choice method requires that if one group goes up, others must go down):

In 10 out of 12 groups of both sexes the adaptation ratios of those who attended public or private kindergarten are higher than those who attended neither. The exceptions were former Pr K pupils who had now reached Grade III.

The adaptation ratios of girls' groups were invariably higher than those of boys', as were their report-card grades.

Non-kindergarten children of both sexes show a steady improvement from Grade I to Grade III but the relative improvement of Non K boys is not as great as that of Non K girls.

The public-kindergarten girls' ratios show steady improvement from Grade I to Grade III. There is no significant trend for the public-kindergarten boys.

Private-kindergarten pupils of both sexes are selected by teachers as best adapted in Grade I. From that point onward there is a steady regression in their selection until, in Grade III, their adaptation ratios are not only lower than those of the public-kindergarten pupils, but also of the pupils who had never attended a kindergarten of either type.

The high ratings given Pr K pupils in Grade I may be due to a known tendency of some Pr K teachers to introduce Grade I school subjects in kindergarten. As "adaptation" is related to achievement in the minds of teachers, the decrease in adaptation may mean failure to maintain a high achievement level after entry to public school. We may also speculate on the eventual effect of too early introduction of the three R's.

KINDERGARTEN ATTENDANCE AND INTELLIGENCE

Children who have attended kindergarten are reported to have higher I.Q.'s. That appears to be the case in the present study, but it is difficult to determine whether it is due to such attendance or to family selection. It also is very difficult to use before-and-after measurements at such an early age. Mental Age is, of course, a more suitable measure for young children and should be used for control groups whenever possible. Mental ages obtained on the Kuhlmann-Finch Test were available for Grade II in Victoria and three categories: high, modal and low, could be sorted out to use as controls for the comparison of achievement test results.

The kindergarten and non-kindergarten groups were not completely equivalent: the consistency of the M.A.'s was accompanied by accidental counter-variation of the C.A.'s and I.Q.'s. The Non K boys were slightly older and had lower I.Q.'s; among Pr K pupils both boys and girls were slightly younger and had higher I.Q.'s. There were fewer low-mental-age Pr K boys and K and Pr K girls, and only in these distributions were the Means or Medians affected significantly. Unfortunately, time and the limited amount of data available did not permit further equating of the groups. It may be stated, however, that the variations in mental age are much less than the differences in the other criteria (report-card ratings, adaptation, achievement) would lead one to expect.

Table XIV:-

Mean Mental Age by Sex and Kindergarten Attendance (Kuhlmann-Finch Grade II, S.D. 61)

	Boys				Girls				
	K	Pr K	Non K	Total	K	Pr K	Non K	Total	
High M.A. Group 8-6 +	8-11	8-11	9-0	8-11	8-11	8-11	8-11	8-11	No sig. diff.
Modal M.A. Group 8-5 to 7-6	7-11	7-11	7-11	7-11	7-11	8-0	7-11	7-11	No sig. diff.
Low M.A. Group 7-5 -	7-2	7-1	7-2	7-2	7-2	7-3	7-1	7-2	Pr K/Non K girls but not sig.
Mean M.A. Total	8-1	8-1	8-1	8-1	8-2	8-3	8-0	8-1	Sig. diff. due to shortage of low M.A. K and Pr K girls.
Md. M.A. Total	8-0	8-0	8-0	8-0	8-2	8-2	8-0	8-0	
Md. I.Q. Total	108	108	105	107	110	113	106	109	
Md. C.A. Total	7-7	7-6	7-8	7-7	7-7	7-7	7-7	7-7	
Mean I.Q. Total	107	109	106	107	110	113	107	109	
Mean C.A.	7-8	7-7	7-9	7-8	7-7	7-6.5	7-8	7-7	

Table XV:-

Number and Per Cent of Cases in Mental Age Groups by Sex and Kindergarten Attendance (Kuhlmann-Finch Grade II, S.D. 61)

		Boys				Girls			
		K	Pr K	Non K	Total	K	Pr K	Non K	Total
High M.A. Group 8-6 +	N:	112	43	123	278	127	44	94	265
	%:	27.7	28.9	28.1	28.0	35.5	35.8	23.0	29.8
Modal M.A. Group 8-5 to 7-6	N:	224	87	248	559	180	69	253	502
	%:	55.3	58.4	56.6	56.4	50.3	56.1	61.9	56.4
Low M.A. Group 7-5 -	N:	69	19	67	155	51	10	62	123
	%:	17.0	12.8	15.3	15.6	14.2	8.1	15.2	13.8
Total		405	149	438	992	358	123	409	890

The low proportions of low M.A.'s among pupils who have attended private kindergartens indicates a considerable amount of selection in both sexes, unless of course one makes the assumption that attendance at a private kindergarten raises the M.A. while attendance at a public kindergarten does not.

The fact that the I.Q.'s on the previous page average well above 100 is not surprising. B.C. Province-wide surveys with large numbers of other tests usually have produced means about 107, with a mean for S.D. 61 that is slightly higher.

RELATIONSHIP OF KINDERGARTEN ATTENDANCE TO ACHIEVEMENT IN GRADE II

Standardized achievement tests were administered to all Grade II pupils in S.D. 61 by the Greater Victoria Department of Tests and Measurements in January, 1959. Pupils' scores on the Stanford Achievement, Primary, Form J Reading and Word Meaning tests, and the Greater Victoria Grade II Spelling and Arithmetic tests were transferred to punched cards and sorted for mental age group; adaptation to school; and kindergarten, private kindergarten and non-kindergarten attendance. The relation of subsequent achievement to teachers' ratings for adaptation was noted previously in the Table on Page 28.

In the following Tables we may notice:

(1) Achievement test scores and Kuhlmann-Finch Mental Ages of groups followed the same pattern.

(2) In spite of the similarity of their mental ages, girls of equivalent mental age greatly outscored the boys. The least superiority was in arithmetic.

(3) In general, Grade II K children outscored Non K children, and Grade II Pr K children outscored those who had attended public kindergartens.

(Caution: (1) The groups were not equated for home background.

(2) The relationship of achievement to adaptation ratings leads to the expectation that the apparent Pr K superiority in achievement might decrease or disappear in Grade III.

(3) No data on the number of hours of kindergarten attendance has been collected. It is probable that hours of attendance at Pr K's were greater.

(4) No information on the amount of teaching of number work or reading in the Pr K's has been collected.)

Table XVI:-
Mean Stanford Primary J "Reading" Scores

Greater Victoria Grade II Pupils by Sex, Mental Age Group, and Kindergarten Attendance

	Boys				Girls			
	K	Pr K	Non K	Total	K	Pr K	Non K	Total
High M.A. Group 8-6 +	27.3	29.4	27.6	27.7	33.6	35.1	28.9	32.2
Modal M.A. Group 8-5 to 7-6	21.8	22.4	20.4	21.3	27.1	27.6	25.3	26.3
Low M.A. Group 7-5 -	17.3	12.5	14.2	15.4	19.1	18.2	18.6	18.8
Total	22.6	23.1	21.5	22.2	28.3	29.6	25.1	27.0
Number of Pupils	396	146	428	970	349	120	396	865

Reading Comprehension of the high M.A. groups of girls and the modal M.A. groups of both sexes followed the order: Pr K/ K/ Non K.

In the low M.A. groups of both sexes Public Kindergarten pupils were highest and Private Kindergarten pupils were lowest.

Table XVII:-
Mean Stanford Primary J "Word Meaning" Scores

Greater Victoria Grade II Pupils by Sex, Mental Age Group, and Kindergarten Attendance

	Boys				Girls			
	K	Pr K	Non K	Total	K	Pr K	Non K	Total
High M.A. Group 8-6 +	23.0	24.6	23.1	23.3	26.8	28.8	23.2	25.9
Modal M.A. Group 8-6 to 7-6	19.1	19.1	18.1	18.6	22.1	23.5	21.1	21.8
Low M.A. Group 7-5 -	14.6	13.2	13.4	13.9	17.0	16.2	16.5	16.7
Total	19.4	19.9	18.9	19.2	23.0	24.9	20.9	22.3
Number of Pupils	396	146	423	965	350	120	394	864

Word Meaning scores follow much the same pattern as Reading Comprehension, i.e. the private kindergarten pupils are most successful at the high M.A. level. The difference between the two types of kindergartens has disappeared for the modal group of boys.

Public kindergarten girls exceed non-kindergarten girls in all similar categories. Public kindergarten boys exceed non-kindergarten boys in all except the high M.A. group.

Public kindergarten pupils exceed both private and non-kindergarten pupils in the low M.A. groups of both sexes. Again, the Pr K pupils' achievement is lowest.

Table XVIII:-
Mean Greater Victoria Spelling Test Error Scores

Greater Victoria Grade II Pupils by Sex, Mental Age Group and Kindergarten Attendance

	Boys				Girls			
	K	Pr K	Non K	Total	K	Pr K	Non K	Total
High M.A. Group 8-6 +	9.6	8.7	9.4	9.4	5.0	5.1	7.6	6.0
Modal M.A. Group 8-5 to 7-6	13.9	14.0	15.3	14.5	8.9	8.1	10.4	9.5
Low M.A. Group 7-5 -	17.8	18.8	22.5	19.9	14.1	14.7	15.6	14.9
Total	13.4	13.1	14.7	14.0	8.4	7.6	10.6	9.3
Number of Pupils	379	137	415	931	326	108	369	803

Low error scores represent success in spelling and, in general, both types of kindergarten attendance are beneficial, but notice the exception in the high M.A. group of boys.

Pr K groups excel on the average although superiority over the K group is not evident in the modal M.A. group of boys.

Again, K pupils exceed Pr K pupils at the lower M.A. levels, but the pattern has changed and Non K pupils are lowest in spelling.

Table XIX:-
Mean Greater Victoria Arithmetic Test Scores

Greater Victoria Grade II Pupils by Sex, Mental Age Group and Kindergarten Attendance

	Boys				Girls			
	K	Pr K	Non K	Total	K	Pr K	Non K	Total
High M.A. Group 8-6 +	52.4	54.6	52.8	52.9	54.5	55.4	50.9	53.4
Modal M.A. Group 8-5 to 7-6	44.8	44.5	44.0	44.4	45.9	45.8	46.3	46.1
Low M.A. Group 7-5 -	33.3	35.6	32.3	33.2	34.1	33.9	33.6	33.8
Total	44.9	46.4	44.8	45.1	47.3	48.2	45.5	46.6
Number of Pupils	396	144	426	966	348	121	396	865

Results of the Arithmetic test differ considerably from those in other subject fields, particularly in the case of the low M.A. Pr K boys.

In general, results are not significant except for high M.A. girls where kindergarten attendance of both types apparently is beneficial.

RELATIONSHIP OF KINDERGARTEN ATTENDANCE TO RETARDATION AND ACCELERATION

The definition of retardation and acceleration issued to the teachers (see Page 13) definitely excluded pupils who were merely over-age or under-age for their grade. Because of this fact and because the data were collected on December 1st, both retardation and acceleration percentages are lower than those which usually are reported for the Province.

The numbers of accelerated pupils are so small that although the differences are statistically "significant" no claims of reliability of the percentages can be made. But a general trend is noticeable toward greater acceleration of Pr K pupils. To this must be added a noticeable "under-ageness" of Pr K girls and boys (see Page 31) which may be due to pre-instruction in primary subjects, enabling them to enter public school Grades II or III with slightly lower C.A.'s.

The retardation figures are large enough to be reliable and it will be noticed that the retardation of Non K pupils of both sexes is much higher in Grades I and II, and still significantly higher in Grade III, than that of the corresponding groups of pupils who attended kindergartens of either type. This is an important point, not only in regard to the cost of operation of kindergartens, but in relation to the results in terms of pupil success and satisfaction and the saving of teacher time in the primary and elementary grades.

On the other hand, a rather puzzling reversal of position of K and Pr K retardation percentages occurs from Grade II to Grade III. Although it occurs in the tabulations of both boys and girls and is statistically significant, it may be due to idiosyncrasies of the Grade II and Grade III populations that were investigated. Attention is called to the contrast between retardation of these two groups and "adaptation to school" as rated by the teachers. Perhaps some of the public kindergarten pupils are better adapted because they have been proceeding at a slightly slower pace.

Table XX:-
Per Cent of K, Pr K and Non K Pupils Accelerated by December 1st in Grades I, II, III

	Boys				Girls			
	K	Pr K	Non K	Total	K	Pr K	Non K	Total
Grade III								
Total Pupils	522	768	2,418	3,706	527	743	2,155	3,425
No. Accelerated	2	3	9	14	5	10	9	24
Per Cent	.4	.4	.4	.4	.9	1.3	.4	.7
Grade II								
Total Pupils	821	858	2,199	3,878	743	768	2,037	3,548
No. Accelerated	5	18	15	39	5	23	18	46
Per Cent	.7	2.1	.7	1.0	.7	3.0	.9	1.3
Grade I								
Total Pupils				4,199	1,056	761	1,888	3,705
No. Accelerated				0	0	1	1	2
Per Cent						.1	.05	.05

Table XXI:-
Per Cent of K, Pr K and Non K Pupils Retarded by December 1st in Grades I, II, III

	Boys				Girls			
	K	Pr K	Non K	Total	K	Pr K	Non K	Total
Grade III								
Total Pupils	522	768	2,416	3,706	527	743	2,155	3,425
No. Retarded	85	103	437	625	33	32	193	258
Per Cent	16.3	13.4	18.1	16.9	6.3	4.3	9.0	7.5
Grade II								
Total Pupils	821	858	2,199	3,878	743	768	2,037	3,548
No. Retarded	70	100	353	523	28	36	163	227
Per Cent	8.5	11.7	16.1	13.5	3.8	4.7	8.0	6.4
Grade I								
Total Pupils	1,164	853	2,182	4,199	1,056	761	1,888	3,705
No. Retarded	52	39	288	379	32	16	112	160
Per Cent	4.5	4.6	13.2	9.0	3.0	2.1	5.9	4.3

APPENDIX I

Table XXII:-
Adaptation of K, Pr K and Non K Children, Grade I

	Boys				Girls			
			Adaptation				Adaptation	
	No.	%	Index	Ratio	No.	%	Index	Ratio
Public Kindergarten (K)	1,175	100	- 5.9	.696	1,053	100	10.4	1.965
Adapted ("Blues")	158	13.4			222	21.1		
Medium Group	790	67.2			718	68.2		
Ill-adapted ("Reds")	227	19.3			113	10.7		
Private Kindergarten (Pr K)	854	100	- 3.9	.796	761	100	14.8	2.638
Adapted ("Blues")	129	15.1			182	23.9		
Medium Group	563	65.9			510	67.0		
Ill-adapted ("Reds")	162	19.0			69	9.1		
Non Kindergarten (Non K)	2,186	100	-12.3	.451	1,898	100	6.8	1.553
Adapted ("Blues")	221	10.1			365	19.2		
Medium Group	1,476	67.5			1,298	68.4		
Ill-adapted ("Reds")	489	22.4			235	12.4		
Totals, Grade I	4,215	100	- 8.7	.579	3,712	100	9.5	1.844
Adapted	508	12.1			769	20.7		
Medium Group	2,829	67.1			2,526	68.0		
Ill-adapted	878	20.8			417	11.2		
Boys + Girls, Grade I	7,927	100	- .2	.986				
Adapted	1,277	16.1						
Medium Group	5,355	67.6						
Ill-adapted	1,295	16.3						

The Adaptation Index is the difference between the per cents well- and ill-adapted as selected by their teachers. Negative values are in the ill-adapted direction.

The Adaptation Ratio is the ratio of the numbers well/ill-adapted in each group. 1.00 would indicate equal numbers of "blues" and "reds", i.e. pupils selected as well- and poorly-adapted. Values from 0 to 1.0 indicate an excess of poorly-adapted pupils in the group.

APPENDIX I

Table XXIII:-
Adaptation of K, Pr K and Non K Children, Grade II

	Boys				Girls			
			Adaptation				Adaptation	
	No.	%	Index	Ratio	No.	%	Index	Ratio
Public Kindergarten (K)	824	100	- 9.1	.540	744	100	11.7	2.130
Adapted ("Blues")	88	10.7			164	22.0		
Medium Group	573	69.5			503	67.6		
Ill-adapted ("Reds")	163	19.8			77	10.3		
Private Kindergarten (Pr K)	853	100	- 8.6	.603	760	100	10.3	2.026
Adapted ("Blues")	111	13.0			154	20.3		
Medium Group	558	65.4			530	69.7		
Ill-adapted ("Reds")	184	21.6			76	10.0		
Non-Kindergarten (Non K)	2,199	100	- 9.5	.522	2,043	100	9.7	1.971
Adapted ("Blues")	228	10.4			402	19.7		
Medium Group	1,534	69.8			1,437	70.3		
Ill-adapted ("Reds")	437	19.9			204	10.0		
Totals, Grade II	3,876	100	- 9.2	.545	3,547	100	10.2	2.017
Adapted	427	11.0			720	20.3		
Medium Group	2,665	68.8			2,470	69.6		
Ill-adapted	784	20.2			357	10.1		
Boys + Girls, Grade II	7,423	100		.08 1.01				
Adapted	1,147	15.45						
Medium Group	5,135	69.2						
Ill-adapted	1,141	15.37						

APPENDIX I

Table XXIV:-
Adaptation of K, Pr K and Non K Children, Grade III

	Boys				Girls			
			Adaptation				Adaptation	
	No.	%	Index	Ratio	No.	%	Index	Ratio
Public Kindergarten (K)	522	100	- 4.7	.719	529	100	15.5	2.608
Adapted ("Blues")	64	12.3			133	25.1		
Medium Group	369	70.7			345	65.2		
Ill-adapted	89	17.0			51	9.6		
Private Kindergarten (Pr K)	768	100	-15.5	.414	741	100	9.4	1.886
Adapted ("Blues")	84	10.9			149	20.1		
Medium Group	481	62.6			513	69.2		
Ill-adapted ("Reds")	203	26.4			79	10.7		
Non-Kindergarten (Non K)	2,421	100	- 8.8	.561	2,157	100	10.0	2.053
Adapted ("Blues")	272	11.2			423	19.6		
Medium Group	1,664	68.7			1,528	70.8		
Ill-adapted ("Reds")	485	20.0			206	9.6		
Total, Grade III	3,711	100	- 9.6	.541	3,427	100	10.8	2.098
Adapted	420	11.3			705	20.6		
Medium Group	2,514	67.7			2,386	69.6		
Ill-adapted	777	20.9			336	9.8		
Boys + Girls, Grade III	7,138	100	.2	1.01				
Adapted	1,125	15.8						
Medium Group	4,900	68.6						
Ill-adapted	1,113	15.6						

APPENDIX II

TABLE XXV:-

SUMMARY OF FIRST (FALL) REPORT CARD GRADES

Grade	Sex		Number	Health Habits O	G	N	S	U	General Beh O	G	N
III	Boys	S.D. 61	962	4	122	790	40	6	1	133	713
		S.D. 39	2722	70	605	1904	125	18	86	594	1579
		Total (51.9%)	3684	74	727	2694	165	24	87	727	2292
		% of boys		2.0	19.7	73.1	4.5	.7	2.4	19.7	62.2
III	Girls	S.D. 61	850	20	236	576	9	9	13	275	533
		S.D. 39	2562	153	915	1452	38	4	223	960	1228
		Total (48.1%)	3412	173	1151	2028	47	13	236	1235	1761
		% of girls		5.1	33.7	59.4	1.4	.4	6.9	36.2	51.6
Total III		% of Gr. III	(7096)	3.5	26.5	66.3	3.0	.5	4.6	27.6	57.1
II	Boys	S.D. 61	1033	7	76	921	10	19	6	114	789
		S.D. 39	2818	77	600	1979	128	33	95	592	1783
		Total (52.3%)	3851	84	676	2900	138	52	101	706	2572
		% of boys		2.2	17.6	75.3	3.6	1.4	2.6	18.3	66.8
II	Girls	S.D. 61	932	16	146	760	9	1	26	218	661
		S.D. 39	2574	142	893	1489	44	5	194	923	1356
		Total (47.7%)	3506	158	1039	2249	53	6	220	1141	2017
		% of girls		4.5	29.6	64.2	1.5	.2	6.3	32.5	57.5
Total II		% of Gr. II	(7357)	3.3	23.3	70.0	2.6	.8	4.4	25.1	62.4
I	Boys	S.D. 61	1051	0	103	925	20	3	4	166	756
		S.D. 39	3091	96	666	2129	174	26	101	651	1924
		Total (52.8%)	4142	96	769	3054	194	29	105	817	2680
		% of boys		2.3	18.6	73.7	4.7	.7	2.5	19.7	64.8
I	Girls	S.D. 61	895	1	168	713	12	1	4	248	609
		S.D. 39	2808	166	748	1795	90	9	176	805	1665
		Total (47.2%)	3703	167	916	2508	102	10	180	1053	2274
		% of girls		4.5	24.7	67.7	2.8	.3	4.9	28.4	61.4
Total I		% of Gr. I	(7845)	3.4	21.5	70.9	3.3	.5	3.6	23.8	63.2
Total Primary		S.D. 61 (%)	5723	.8	14.9	81.9	1.7	.7	.9	20.2	71.0
		S.D. 39	16575	4.2	26.7	64.9	3.7	.6	5.3	27.3	57.3
Total Primary		(%)	22298	3.4	23.7	69.2	3.1	.6	4.2	25.5	61.8

TABLE XXV:-

SUMMARY OF FIRST (FALL) REPORT CARD GRADES

Health Habits					General Behaviour					Work Habits				
O	G	N	S	U	O	G	N	S	U	O	G	N	S	U
4	122	790	40	6	1	133	713	92	23	2	121	588	185	66
70	605	1904	125	18	86	594	1579	359	104	77	508	1386	591	158
74	727	2694	165	24	87	727	2292	451	127	79	629	1974	776	224
2.0	19.7	73.1	4.5	.7	2.4	19.7	62.2	12.2	3.4	2.1	17.1	53.6	21.1	6.1
20	236	576	9	9	13	275	533	18	11	11	248	503	62	26
153	915	1452	38	4	223	960	1228	127	24	219	882	1170	244	47
173	1151	2028	47	13	236	1235	1761	145	35	230	1130	1673	306	73
5.1	33.7	59.4	1.4	.4	6.9	36.2	51.6	4.2	1.0	6.7	33.1	49.0	9.0	2.1
3.5	26.5	66.5	3.0	.5	4.6	27.6	57.1	8.4	2.3	4.4	24.8	51.4	15.3	4.2
7	76	921	10	19	6	114	789	68	56	19	116	630	173	95
77	600	1979	128	33	95	592	1783	273	75	83	500	1519	564	152
84	676	2900	138	52	101	706	2572	341	131	102	616	2149	737	247
2.2	17.6	75.3	3.6	1.4	2.6	18.3	66.8	8.9	3.4	2.6	16.0	55.8	19.1	6.4
16	146	760	9	1	26	218	661	21	6	25	226	561	89	31
142	893	1489	44	5	194	923	1356	83	18	170	806	1300	252	46
158	1039	2249	53	6	220	1141	2017	104	24	195	1032	1861	341	77
4.5	29.6	64.2	1.5	.2	6.3	32.5	57.5	3.0	.7	5.6	29.4	53.1	9.7	2.2
3.3	23.3	70.0	2.6	.8	4.4	25.1	62.4	6.0	2.1	4.0	22.4	54.5	14.7	4.4
0	103	925	20	3	4	166	756	82	39	4	146	583	240	73
96	666	2129	174	26	101	651	1924	331	84	94	527	1631	655	184
96	769	3054	194	29	105	817	2680	413	123	98	673	2214	895	257
2.3	18.6	73.7	4.7	.7	2.5	19.7	64.8	10.0	3.0	2.4	16.3	53.5	21.6	6.2
1	168	713	12	1	4	248	609	26	8	7	219	531	109	28
166	748	1795	90	9	176	805	1665	142	20	159	729	1512	323	84
167	916	2508	102	10	180	1053	2274	168	28	166	948	2043	432	112
4.5	24.7	67.7	2.8	.3	4.9	28.4	61.4	4.5	.8	4.5	25.6	55.2	11.7	3.0
3.4	21.5	70.9	3.8	.5	3.6	23.8	63.2	7.4	1.9	3.4	20.7	54.3	16.9	4.7
.8	14.9	81.9	1.7	.7	.9	20.2	71.0	5.4	2.5	1.2	18.8	59.4	15.0	5.6
4.2	26.7	64.9	3.7	.6	5.3	27.3	57.5	7.9	2.0	4.8	23.8	51.4	15.9	4.0
3.4	23.7	69.2	3.1	.6	4.2	25.5	61.0	7.3	2.1	3.9	22.6	53.5	15.6	4.4

APPENDIX III

A NOTE ON THE SIGNIFICANCE OF DIFFERENCES

The large number of primary pupils that constitutes the total population in this study, 22,298, may give an impression of statistical significance that is not warranted in many of the subdivided groups. For example in Grade I only 10 girls and 29 boys were given "Unsatisfactory" ratings in Health Habits in the whole of Greater Victoria and Vancouver. And in many of the comparisons true significance and representativeness of the samples are not merely a matter of numbers. The distributions of 16,575 report-card grades in S.D. 39 are not at all representative of the 5,723 in S.D. 61. (See Summary, p. 43). On the other hand some relatively small numbers may produce differences that are highly significant from a common-sense point of view even though they are not statistically "significant". For example, consider the consistency of the test results of the low M.A. groups attending private kindergartens.

The use of computers and consequent ease of calculation have produced a series of studies which are likely to give an impression that "significant" and "not significant" are absolutes that lie on either side of a critical ratio of 1.96 although the significance of differences is a matter of degree and a "significant difference" is not proof that a causal relationship exists. In this study we have tried to avoid giving the impression that merely because teachers in two large school districts gave favourable reports to children who have attended kindergarten all teachers will always do the same. For that and other reasons, chiefly the unavailability of a computer, we have merely sampled some of the huge numbers of differences that have been obtained to obtain an idea of their statistical significance. The reader is left with the problem of deciding whether a difference is important, and whether a similar difference is likely to occur in another year in another administrative area.

As examples we may consider the proportions of Grade I boys assigned report-card grades of Outstanding and Good in Work Habits:

	(O + G) N	(O + G) %	Total N (O,G,N,S,U)
Kindergarten	231	19.9	1,163
Private Kgn.	179	21.0	854
Non-Kindergarten	371	17.2	2,159

(a) Is the difference of 1.1% between K and Pr K boys significant?

$$\sigma_{D\%} = 100\sqrt{\frac{P_1Q_1}{N_1} + \frac{P_2Q_2}{N_2}} \qquad C.R. = \frac{\%_1 - \%_2}{\sigma_{D\%}}$$

$$= 100\sqrt{\frac{.210 \times .790}{854} + \frac{.199 \times .801}{1163}} = 1.8203.$$

$$C.R. = \frac{1.1}{1.82} = .60$$

This is "not significant" but the chances are 73/100 that the "true" difference > zero.

(b) Is the difference of 2.7% between K and Non K boys significant?

$$\sigma_{D\,\%} = 100\sqrt{\frac{.199 \times .801}{1163} + \frac{.172 \times .828}{2159}} = 1.425$$

$$C.R. = \frac{19.9 - 17.2}{1.425} = 1.89$$

This also is "not significant" but the chances are 97/100 that the "true" difference > zero.

(c) Is the difference of 3.8% between Pr K and Non K boys significant?

$$\sigma_{D\,\%} = 100\sqrt{\frac{.210 \times .790}{854} + \frac{.172 \times .828}{2159}} = 1.613$$

$$C.R. = \frac{21.0 - 17.2}{1.613} = 2.36$$

This is "significant at the .05 level" and the chances are 99/100 that the "true" difference > zero.

(d) Are there significantly more Grade I Non K girls who are Outstanding or Good in General Behaviour (33.3%) than in Work Habits (27.9%)?

$$\sigma_{D\,\%} = 100\sqrt{\frac{.333 \times .667}{1889} + \frac{.279 \times .821}{1889}} = 1.545$$

$$C.R. = \frac{33.3 - 27.9}{1.545} = 3.495$$

This is "significant at the .01 level" and the chances are well above 999/1000 that the "true" difference > zero.

But notice the question and its tense; should it not have been worded: "Were teachers inclined to rate significantly more Grade I Non K girls as O or G in General Behaviour than they (the teachers) were in their ratings of the Work Habits of the pupils?" The answer to this question is definitely affirmative, while the answer to the original one is only "Possibly" or "The evidence seems to point in that direction." Moreover, examination of the distributions shows that there is a general tendency for teachers to give higher ratings in Behaviour than in Work Habits to all types of pupils. Also, a greater range exists in Non K girls' Work Habits ratings than in the General Behaviour ratings, or in either of the girls' kindergarten groups.

APPENDIX IV

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Note:- The following reference covers much of the American and some of the British reference material on Kindergartens. Unfortunately no Canadian references were included:

Bain, David A.: "The Kindergarten in Our Modern Society; An Analysis of Selected Research." Information Bulletin No. 1, British Columbia Educational Research Council, Vancouver (U.B.C.), 1967. Pp. 38.

There seem to have been some misinterpretations and misinformation in the section on "Kindergartens in British Columbia", Ibid., pp. 5-8, and it is recommended that the first section of this study: "The Development of Kindergartens in B.C. Public Schools" be substituted for Bain's section.

1. It seems that F. Henry Johnson (q.v. below) was misinformed as to some of the steps taken by the Provincial authorities in encouraging the establishment of kindergartens, 1922 to 1958, and in cooling off the expansion of kindergartens during the 1958-61 period when elementary school accommodation and staff shortages were at their worst. Bain repeats Johnson's misinformation and his statement: "In 1962, the Annual Report stated that the government would share building costs of kindergartens, but that operating costs would have to be borne locally" is quite incorrect. What happened on March 29th, 1962, was that the restrictive clause in the Public Schools Act which had been applied since 1958, requiring the approval of the Superintendent of Education, was removed, thus permitting the rapid expansion in enrolment that has since taken place. A year earlier on March 27th, 1961 (not 1958), half-grants had been applied to what actually were and are slightly less than half-time pupils.

2. Bain's report also contains a paragraph (p. 6) on the Departmental Pre-primary Education Committee and the Royal Commission on Education in which there is some confusion as to what the Committee recommended and what the Commission recommended.

Speaking for the Committee, F.P. Levirs stated that, "This Committee was NOT asked to make recommendations as to whether or not kindergartens should be (a) discontinued; (b) be continued on the present basis, or (c) become an integral part of the school system ...."

Influenced by the work of the Committee and others, and speaking for the Commission, Dean Chant stated that, "The Commission recommends that kindergartens of a type required to meet local needs be established at the discretion of the local boards of school trustees; that the expense of such kindergartens be shareable; that no fees be charged; that attendance be voluntary; .... etc."

Johnson, F. Henry: A History of Public Education in British Columbia. Publications Centre. University of British Columbia, Vancouver. 1964. Pp. 171-2, 268.

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Church, E.J.M.: "An Evaluation of Preschool Institutions in Canada." Canadian Education, V, 3, June, 1950, Pp. 14-46.

Gillespie, Verna Grace: The Effect of Kindergarten Training on Achievement in Reading and Arithmetic in Grade II. Unpublished M.Ed. Thesis, University of Washington, Seattle, Wash. 1958. Pp. 38.

Miss Gillespie compared 188 kindergarten and 91 non-kindergarten Vancouver, B.C. pupils in Reading and Arithmetic in Grade II in 1957-58. "Approximately half of each group were girls", but the actual proportions in the adjusted samples were 86/183 = 46% kindergarten and 25/42 = 60% non-kindergarten and the groups differed by 2.41 months in M.A. That may partly explain the superiority found in Reading but not in Arithmetic. The elimination of repeaters from the study may also have had an effect.

King, Ethel M. An Experimental Study Comparing Performances of Kindergarten Children Learning to Read Words Following Different Kinds of Visual Discrimination Pre-training. M.Ed. Thesis, 1963, Iowa State University, Ames, Iowa. Pp. 189.

Palmer, Judith: "'Pre-School' Education - Pro's and Con's." Canadian Education and Research Digest, VI, 3, (Sept. 1966). Pp. 174-187.

Mrs. Palmer discusses the inconclusive results obtained from most research into the value of pre-school education and provides 58 references. Most of the latter are American but they range from Australia to Norway. Only 5 are Canadian.

Saffran, Carl: A Study of the Value of Kindergarten Training in the Calgary Public School System. Mimeod. Calgary School Board, Calgary, Alberta. 1953. Pp. 26.

"In general kindergarten children in Grade I appear to be more socially and academically mature than non-kindergarten children, although there are no apparent differences in emotional maturity. By Grade II non-kindergarten children are on a par with kindergarten children and appear to remain so in Grades III and IV." Cf. our findings regarding the adaptation of private kindergarten children from Grades I to III. (P. 29) Saffran does not distinguish pupils by sex.

Toronto, Board of Education (E.N. Wright, Director of Research): Studies of Achievement, Information Bulletins, Publications Department, 155 College St.

No. 1, 1963, (Maturation and Socio-economic level of the sample to be used in evaluating the effect of Junior Kindergarten attendance.) Pp. 7.

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No. 4, 1965, (Comparison of populations of pupils attending Junior and Senior Kindergartens in Toronto, 25 Tables showing origin, defects, families, housing, etc.) Pp. 74.

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